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ABSTRACT

This study was designed to examine complexity of maternal language to 4-, 6-, and 8-month-old male and female infants in a laboratory situation as measured by mean length of utternace (MLU), frequencies of certain sentence types, and other syntactic indices. Subjects were 36 mothers and their infants. There were six male and six female infants at each of the three ages. The infants were placed in a crib with the side near the mother down. Mother-infant interactions were videotaped and coded for 22 language variables. Results indicate that mothers used shorter utterances to 8-month-olds than to 4- or 6-month-olds, presumably in response to infants' changing level of comprehension. Mothers used more sentences with subjects, verbs, or objects deleted to 8-month-olds and mroe complex sentences to 4-month-olds. Results are discussed. (Author/SB)

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# Maternal Language to Prelinguistic Infants: Syntactic Aspects

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## Footnote

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Abstract

Maternal speech to children has been shown to vary by age and language ability of the children. Previous studies have usually involved children over 1 year of age. In this study maternal speech to male and female 4- 6- and 8-month old infants was recorded in the laboratory. Mothers used shorter utterances to 8-month olds than to 4-or 6-month olds, presumably in response to the infant's changing level of comprehension. Mothers used more sentences with subjects, verbs, or objects deleted to 8-month-olds and more complex sentences to 4-month olds.

## Maternal Language to Prelinguistic Infants

Mothers use more complex language when speaking to older children than they do when speaking to younger children (e.g. Baldwin & Baldwin, 1973, Broen, 1972; Phillips, 1973; and Snow, 1972). Snow (1972) found that to some extent this is controlled consciously. Mothers asked to pretend to speak to two or ten year old children used less complex language than they did when speaking with an adult. However, maternal language complexity is also affected by feedback from the child; adults in this study spoke less complexly in the presence of the child than when pretending to speak to the child.

Although feedback from the child is influential, it is not yet known what the feedback mechanism is. To date, researchers have emphasized the child's level of language production as the major component of the feedback (Baldwin & Baldwin, 1973; Phillips, 1973). This tends to orient researchers toward language environment effects after the child can produce language. It seems reasonable to emphasize instead that it is probably the child's receptive ability which is the determining factor affecting maternal speech. Although speech production may be one of the most obvious cues reflecting receptive ability, there are several others, e.g., compliance with commands or orientation toward labeled objects. These other cues can exist prior to speech production and their influence might be ascertained by examining maternal language to infants of different prelinguistic ages. Alterations in maternal complexity by infants' age could be logically ascribed to the children's receptive ability.

This study was designed to examine complexity of maternal language to 4-, 6-, and 8-month old male and female infants in a laboratory situation as measured by mean length of utterance (MLU), frequencies of certain sentence types, and other syntactic indices.

## Method

Subjects. Thirty-six mothers and their infants were subjects. The mothers had a mean educational level of 15 years and were full time homemakers. There were 6 male and 6 female infants at each of 3 ages (4-, 6-, and 8-months).

Apparatus. Each child had a neuter, unclothed squeak doll, 2 plastic rings 8 cm. in diameter, and a rattle during the toys setting. The interactions were filmed in a 4 x 5 m suitably decorated laboratory room with a Sony-videotape camera located 3 m from the crib.

Procedure. Each child was placed in a crib with the side near the mother down. The mother was told that the experimenters were interested in seeing her play with her baby; not just interested in watching the baby. A 6-minute toys (T) and a 6-minute no toys (NT) session were given in counterbalanced order.

Method of Transcribing and Coding Language Sample. The 36 tapes were transcribed. The authors (in pairs) compared the transcripts with the videotapes and made any necessary corrections. The authors required exact agreement on each utterance of the mother; if it could not be obtained, the utterance was considered incomprehensible.

Inter-coder reliability was determined for the frequency of each category using transcripts from 8 subjects (calculated by Pearson product moment correlation coefficients). The coefficients ranged from .89 to 1.00.

The variables coded were as follows:

1. Total number of utterances, where an utterance was preceded and followed by a pause and/or formed a complete sentence.
2. Meaningful utterances, including only those which were composed of real words and which were completely comprehensible.
3. Mean length of utterance (MLU), where the number of words was divided by the number of utterances composed entirely of words.
4. MLU - game language, e.g. "Peek a boo."
5. Questions, excluding "huh?"
6. Prompters, i.e., "huh?" or "hm?"
7. Incomprehensible utterances, where if part of an utterance was unclear, the entire utterance was considered incomprehensible.
8. Nonword utterances, including all non-standard sounds the mother made with her vocal cords or mouth, including repeated word sounds, e.g., "la, la, la."
9. Nonwords embedded in sentences.
10. Exact repetitions of utterances.
11. Utterances acceptable in speech, e.g., "See the ball?"
12. Utterances without deletions, e.g., "Do you see the ball?" This would be coded as an 11 and a 12. This was a conservative measure and commands, e.g. "Look here", were not counted in the category, although commands rarely have a spoken subject.

13. Utterances not acceptable in adult speech due to deletions, e.g., "That a rattle."
14. Dysfluencies, including interrupted sentences, those with grammatical errors (except for deletions), and isolated phrases, e.g. "Or over there."
15. No verb utterances, e.g., "Hi honey."
16. Verb utterances, e.g., "Look", "Yes, jump."
17. Verb-object utterances, where "object" could also be a locative or a modifier if it completed the verb, e.g., "Get the dolly," "Oops, fall down," "Is pretty?"
18. Subject-object utterances, e.g., "You hot?"
19. Subject-verb utterances.
20. Subject-verb-object utterances.
21. Utterances with auxiliary verbs, e.g., "You have eaten." This utterance would be coded as a 19 and a 21.
22. Compound sentences, in which two or more base sentences were joined together, including sentences with conjunctions, multiple clauses, more than one independent verb (or infinitive).

## Results

There was an average of 341 utterances examined for each mother. The mean frequency for variables by age are presented in Table 1.

Three way analyses of variance were run on all variables, i.e., 3 (age) x 2 (setting x 2 (sex).

Age of infant affected maternal MLU, with mothers using shorter sentences in speech to 8-month olds than to 4-month olds or 6-month olds, $F$ (2,30) = 6.37, $p < .01$. Although MLU decreased for speech in general, there was no decrease in game language MLU by age. The decrease in MLU in non-game language for 8-month olds was reflective of a change in the grammatical complexity of maternal language. Mothers tended to use more simple utterances for 8-month olds and more complex/compound utterances for 4- and 6-month olds. These tendencies reached significance more at the extremes of complexity. That is, mothers used more verb-only utterances for older infants, $F$ (2,30) = 7.58, $p < .005$. There were significantly more compound sentences for younger infants, $F$ (2,30) = 3.40, $p < .05$. No-verb utterances occurred least frequently for 6-month olds, $F$ (2,30) = 4.86, $p < .05$. There were no significant differences on the other structural categories.

Setting of the interaction affected several variables. During the no toy setting there were more total utterances, $F$ (1,30) = 38.41, $p < .001$, more meaningful utterances (T = 125, NT = 144), $F$ (1,30) = 17.89, $p < .001$, more repetitions (T = 20, NT = 26), $F$ (1,30) = 12.43, $p < .01$, more nonwords (T = 12, NT = 18), $F$ (1,30) = 9.70, $p < .005$, more no-verb utterances (T = 23, NT = 30), $F$ (1,30) = 9.8, $p < .01$, and more compound sentences (T = 22, NT = 27), $F$ (1,30) = 3.40, $p < .05$.

In terms of general descriptive information, 37 percent of the utterances were utterances without deletions. Another 28 percent were acceptable in spoken English, but contained some deletions. Only about 4 percent had deletions not acceptable to adults and less than 1 percent were dysfluencies.

More than a quarter of the utterances were questions. About 13 percent of the total utterances were repetitions. About 10% of the total utterances were nonword sounds alone. Nonword sounds are rarely embedded in sentences, but tend to be made as complete utterances.

## Discussion

While maternal utterances to younger language producing children are usually shorter and simpler than those to older children (Broen, 1972, Fraser and Roberts, 1975, Phillips, 1973) or adults (Broen, 1972; Phillips, 1973), the results from this study indicate that maternal utterances to younger prelinguistic children (4- or 6-month olds) are longer and more complex than those to older prelinguistic children (8-month olds). This indicates that older prelinguistic infants are probably responding to simple maternal utterances more than to complex ones. This change with age was unaffected by the child's sex or the setting. If 8-month olds' comprehension of maternal speech and subsequent responses to that speech are accurate and frequent enough to cause their mothers to appropriately alter speech complexity this underscores the importance of the first year of life in language learning. Heretofore, language learning has been emphasized and examined for children over one or two years of age. A great deal of learning may occur before that time. We predict that if measurements of maternal speech were made to the same infants over the first decade or so of life, a modified U shaped curve of complexity of speech would be seen. That is, at first maternal language complexity, when speaking to

infants, would be fairly high. As the infant's language receptive ability first began to develop, maternal complexity would decrease. Finally, as the children's language ability increased over time, maternal complexity would increase until it reached adult levels.

In terms of descriptive aspects of the data, there was a great deal of variability. In some cases the standard deviation was greater than the mean. Phillips (1973) also reported a high variability in maternal speech to prelinguistic children. However, the constraints placed upon the mothers by the instructions (i.e., to interact with their infants), may be the reason that the variability seen here appears to be less than that seen during naturalistic observations in the home (Cohen & Beckwith, 1976).

An interesting aspect of the data is the large proportion of grammatically complete sentences the mothers used. Some theorists have suggested that adults might provide poor language models for their children. This idea is not supported by our data. On the contrary, and in support of Broen's (1972) data, really incorrect language samples almost never occurred. Even deletions apparently intended to reduce complexity were not common. As well as providing good language models, the mothers pretended that the infants could respond as a conversational partner. Mothers asked many questions, repeated them often, and prompted the child to answer. In rare cases the mother even answered for the child. These language behaviors were not affected by the age of the infants in this study.

In summary, several aspects of a mother's speech are affected by the age of the child to whom she is speaking. For younger prelinguistic infants

mothers use utterances with shorter MLU, use more verb-only utterances, and fewer compound sentences. Also, although her speech is variable in quantity and type by setting, there is consistently a large number of questions, repetitions, and nonword sounds. And, surprisingly, a large proportion of maternal speech is grammatically correct.

Table 1

Mean Frequencies of Maternal Utterances by Age of Infant (Summed Over Settings)

| Category | Age | | |
|---|---|---|---|
| | 4 mos | 6 mos | 8 mos |
| Total Utterances | 361.5 | 298.6 | 364.8 |
| Meaningful Utterances | 326.5 | 256.2 | 344.8 |
| MLU | ~~8.4~~ 4.2 | ~~8.6~~ 4.3 | ~~7.2~~ 3.6 |
| MLU - Game Language | ~~9.4~~ 4.7 | ~~9.6~~ 4.8 | 8.3 4.2 |
| Questions | 102.7 | 80.2 | 84.0 |
| Prompters | 20.2 | 25.4 | 19.7 |
| Incomprehensible Utterances | 2.6 | 1.4 | 1.9 |
| Nonword Utterances | 32.4 | 41.0 | 18.1 |
| Nonwords Embedded in Sentences | 2.9 | 3.0 | 3.5 |
| Exact Repetitions | 43.8 | 39.8 | 53.3 |
| Acceptable Utterances (With or Without Deletions) | 198.6 | 148.0 | 187.7 |
| Acceptable Utterances (Without Deletions) | 110.0 | 91.8 | 94.4 |
| Unacceptable Utterances (Due to Deletions) | 15.9 | 11.4 | 10.5 |
| Dysfluencies | 5.3 | 5.3 | 8.3 |
| No Verb Utterances | 59.3 | 40.0 | 60.4 |
| Verb Utterances | 9.9 | 10.2 | 24.3 |
| Verb-Object Utterances | 38.2 | 24.6 | 52.3 |
| Subject-Object Utterances | 3.8 | 1.2 | .8 |

Table 1 - Continued

| Category | Age | | |
|---|---|---|---|
| | 4 mos | 6 mos | 8 mos |
| Subject-Verb Utterances | 12.0 | 9.3 | 4.4 |
| Subject-Verb-Object Utterances | 94.8 | 69.5 | 89.8 |
| Auxiliary Verb Utterances | 59.2 | 58.2 | 46.3 |
| Compound Sentences | 63.6 | 26.2 | 36.7 |

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